

## Abstract

### Development of Collective Structure and Its Response to Environmental Change

Presented at Bologna (Italy) Innovation & Diversity Conference

July 12-13, 2004

Norman L. Johnson  
Theoretical Division  
Los Alamos National Laboratory  
norman@lanl.gov  
<http://ishi.lanl.gov>

In this discussion of collectives in complex environments, Norman uses the Internet, which is a gigantic maze, as his example environment. In complex domains, beginning points differ, end points differ, but partial paths can overlay and find synergy. In “learning” the maze, individuals create a diversity of experience.

To help the listener understand the process, Norman presents a model for collectives solving *hard* problems, then illustrates how users find the shortest path.

He also discusses

- Developmental view of decentralized systems
- Consequences of complexity
- Effects of environmental change
- Co-existence (identity) dynamics